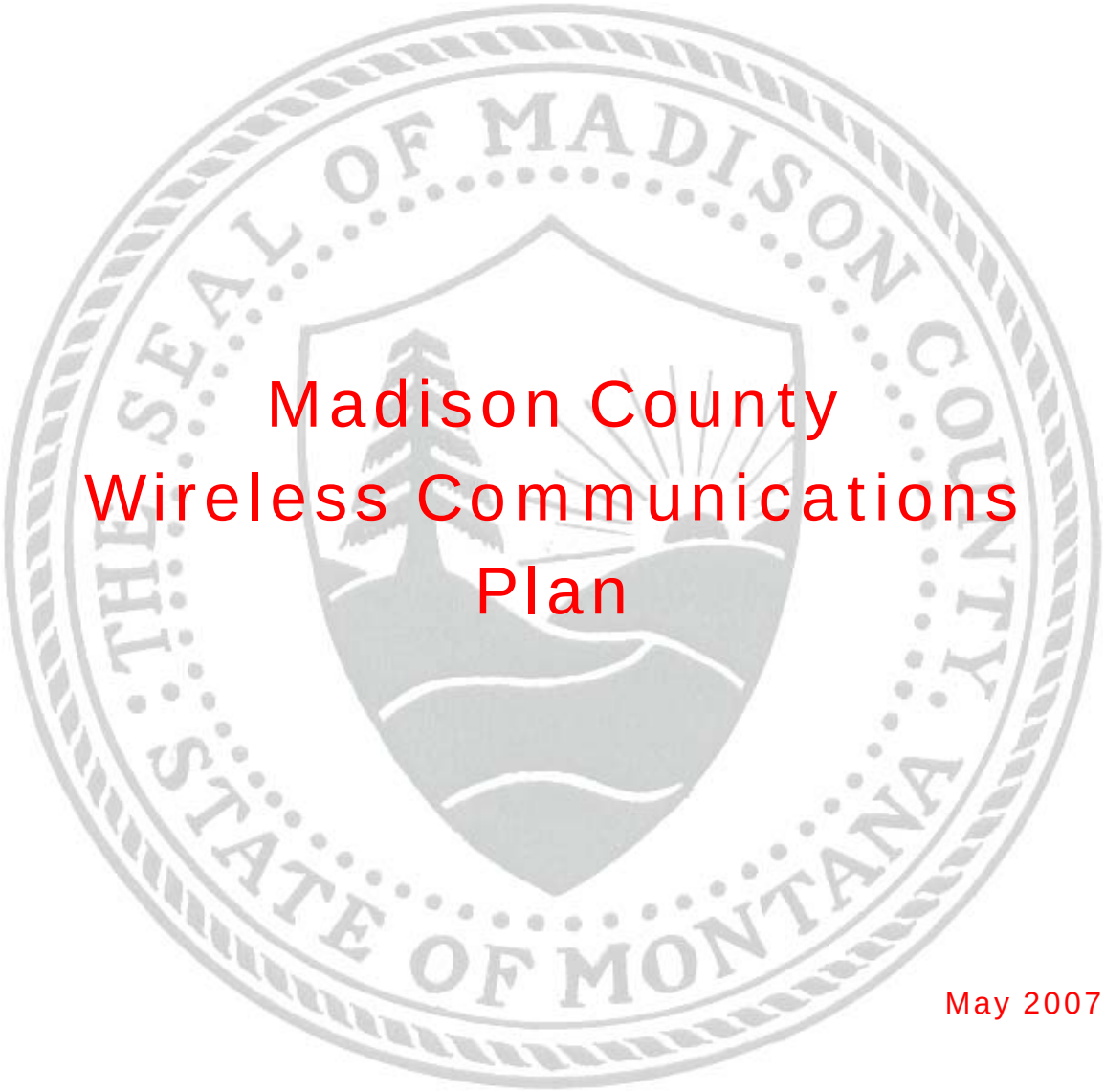

Madison County Wireless Communications Plan

May 2007

MADISON COUNTY WIRELESS COMMUNICATIONS PLAN
Executive Summary

Overview: Effective communications is essential to the fulfillment of county government's responsibilities. The intent of the Madison County Wireless Communication plan is to provide a useable, orderly framework for operation and improvement of the county wireless communications system throughout the entire spectrum of its use. The plan was drafted by the Public Safety Communications Coordinator with substantial continuing advice and assistance by an ad-hoc "Communications Working Group" consisting of Roger Thompson, Janet Fortner, Kevin Barnes, Karen Brown and Al Kyles. With one exception as noted in this summary, the group is in substantive agreement with the entire plan.

Structure: After outlining general considerations relative to the county communications system, the plan presents an assessment of its most prominent features and the environment in which the County public safety services as well as its more general public services currently operate. Following that assessment, the plan sets forth desired improvements for the operations and capabilities of the system. Such goals and objectives are loosely grouped as Near Term (1 to 2 years), Mid Term (3 to 7 years) and Long Term (8 to 10 years).

Assessment: The plan's assessment finds that, while system users are doing an admirable job of coping with its shortfalls, the county wireless communications system suffers from a lack of readily identifiable resources and a need to adopt a reasoned, cohesive, plan for its operation and enhancement. The system is arguably below national and state norms and is in need of carefully crafted and administered initiatives to successfully cope with rapid county growth, exploding technological advancements, and regulatory mandates within extremely limited local resources.

Salient Goals: Near term goals are more detailed than those for later periods. The intent over the next two years is to address immediate high priority needs for improvements to coverage and reliability while at the same time, developing a framework within which an orderly improvement program can progress for the entire system. Groundwork for mandated and other highly desirable changes scheduled to occur beyond this 1-2 year framework must also be addressed. It must be noted that the Madison County Sheriff has expressed reservations regarding the Administrative goal calling for establishment of a new county department to provide centralized management, coordination and administration of the county wireless communications system. Mid and Long term goals support operational "catch up" objectives and adaptive initiatives that will allow the County to accommodate itself growth, regulatory requirements and rapidly developing technological change. Of particular note are goals and objectives aimed at achieving the benefits of improved interconnectivity and ability to transfer data, which open the door for very significant improvements in operational capability.

MADISON COUNTY WIRELESS COMMUNICATIONS PLAN
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Purpose

The purpose and intent of the Madison County Wireless Communications Plan is to provide a framework for the development of policy by the Madison County Board of Commissioners and guidance for the operation, maintenance and improvement of the Madison County wireless communications system. As such, it is a dynamic and continuously evolving document, to be updated and modified as circumstances relating thereto change and develop. The Wireless Communications Plan addresses what is mandatory under law and imposed regulation; what is desirable to maximize communications effectiveness and public safety; and what can be done within resource constraints.

The wireless communications system considered herein includes both that portion dedicated to matters of public safety, centered on the county dispatch and paging system, and that which is used for specialized non-safety related operational matters on a daily basis but which may become a part of the overall provision of public safety services during time of disaster or emergency. Examples of the latter portion include radios and circuits used to support activities of the Road Crews, the Weed department, Sanitation department, the Public Health Administrator, schools and the like. The plan is also intended to encompass local planning and other activity related to usage of state and federal mutual aid and communications interoperability systems including such other specialized frequencies, channels or communications enhancements as may be available during times of emergency or disaster.

Overview

Background

Effective communications is essential to the conduct of county business as Madison County government fulfills its responsibilities to the citizens and visitors within county boundaries. It also is necessary as we meet our responsibilities to neighboring jurisdictions and other entities with which the county has partnerships. While exchange of documents, face to face conversations and other methods of communication are important parts of the overall communications picture in virtually any environment, this plan concentrates on wireless communications and the electronic systems which support them. Traditionally, two types of wireless communications have been assumed to exist: voice and data. That distinction is becoming increasingly blurred with advances in technology and the two are frequently collectively referred to simply as data exchange. While this might seem to simplify consideration of county communications matters, these and related technological advances have made such matters incredibly complex; difficult for the layman to address; and increasingly expensive to implement or maintain. Coupled with federal and state mandates requiring local compliance response; a mushrooming demographic change within the county; and an ongoing environment of severely limited resources, Madison County has had difficulty operating, maintaining and improving its communications system. This has been particularly, albeit not exclusively, true as regards matters of public safety communications.

In January 2007 the Madison County Board of Commissioners contracted for establishment of the position of Public Safety Communications Coordinator as an interim step in determining how best to operate, maintain and enhance the county wireless communications system. One of the primary aims of this initiative was to assess current conditions and begin planning for systematic improvement. This Madison County Wireless Communications Plan is an initial step in fulfillment of that goal.

Current Assessment

General

County wireless communications currently relies primarily on a system of VHF radio repeaters, stations and Land Mobile Radio (LMR) or subscriber equipment found throughout the county which is primarily controlled through one PSAP/Dispatch Center located in the Courthouse in Virginia City. Due to limitations primarily related to coverage and security, recent years have seen an increase in cell phones and land-line telecommunications to augment the wireless system. Satellite phones have seen limited use due to their high usage costs and accompanying fixed cost requirement to have them ready for use.

LMR/User Equipment

A comprehensive communications assessment conducted in 2005 by CTA Communications, Inc. listed the subscriber equipment of Madison County as being the most critically in need of replacement of the five Montana counties it studied. Many, if not most, of the subscriber units in use by responders and county employees were originally obtained second-hand. As a result, much of this equipment is, if not obsolescent, at least aged. Similar age related problems affect the equipment that makes up the supporting infrastructure. Maintenance is a problem, both because of the increased repair requirement associated with long term use and age-related deterioration and because parts and other technical support are becoming increasingly difficult to obtain. Due in part to the accelerating growth-related demands on operating resources, such growth and enhancements as have occurred in the last two or more decades have tended to be in response to equipment failure or experienced limitations. As a result, the system has suffered somewhat from a lack of coordinated planning and failure to impose an integrated, proactive maintenance, replacement and enhancement program. A major complicating factor has been the very limited nature of local financial resources coupled with the paucity of federal homeland security funding that has been made available to local jurisdictions.

Operating practices

An analogous situation exists as regards the protocols and procedures in use by the various county, independent and semi-independent users of the communications system. Responsibilities, assumptions and methods of use have tended to develop somewhat casually during a time when activities were simpler and the community of users considerably smaller and more cohesive. Different agencies utilized somewhat different operating procedures, but that was not a major debilitating factor within this more relaxed environment. With accelerating population growth and attendant demographic shifts, usage patterns have become more complex as call volume has concurrently increased. At the same time, the common base of understanding inherent in a very small number of users and this simpler concept of mutual responsibilities has begun to break down, resulting in increased potential for confusion and misunderstanding along with lessened effectiveness and safety for all concerned. At the same time, interdependence and the role played by mutual aid at all levels have become more prominent. Projections for future demands on the system only point to exacerbation of these trends if increased use of standardized operating procedures and common agreement as to responsibilities and protocols is not more firmly established as a basic requirement for use of the county communications system. Similar codification and standardization has already been occurring at the state, federal and international level. County communications usage needs to reflect and support that process. Recent federal mandates regarding compliance with the National Incident Management System (NIMS) and the Incident Command System (ICS) are a case in point.

Coverage and Traffic Volume

Local VHF public safety communications coverage, while still in the estimated 80% range, has improved dramatically over the past year. Nevertheless, recent enhancements, driven by the

immediacy of the need and very strong resource constraints, were neither adequately coordinated nor optimal in their technology. They were acknowledged when installed as being interim in nature pending establishment of a more comprehensive communications infrastructure plan and identification of resources sufficient to embark upon its implementation. Additional frequency licenses are urgently required to minimize local interference and improve coverage. Improvements in this area will also need to address ongoing tone coded squelch issues that cause interference locally and in other counties. This will, in all likelihood, need coordination with local authorities in the jurisdictions involved and with the Association of Public Safety Communications Officials International (APCO) Local Frequency Coordinator and the Federal Communications Commission (FCC).

In addition to repeaters for the county's own system, CTA Communication, Inc., in their 2005 study of regional interoperability matters, recommended that at least three repeaters for the statewide mutual aid channels be installed in our area.

The county's predominantly rural Montana background, with its assumption of good faith and neighborliness, has led to a plethora of informal agreements related to sites in use by the backbone of the communications system. Many of the existing repeaters currently have no formal site or access agreement. With changes in land ownership; increasingly complex public operations and communications technology; and the contemporary emphasis on legalistic matters and the associated potential for litigation; establishment of some form of contractual relationship for existing and new sites has become, albeit a somewhat daunting task, mandatory. Such agreements are also necessary if proposed efforts to engage the private sector in participation in capital and operating expenses are to be successful.

County wireless communications users all currently share one primary channel, using a system of repeaters and simplex frequencies. With anticipated growth and associated demands on the system, continued ability of this command and control system to meet operational needs becomes more and more problematical. At some point in the future it will become increasingly desirable for law enforcement to have a dedicated channel, with fire and EMS communications on a second or even third channel. Similarly, the Madison County Road Department should, at some time in the near future, be converted to a repeated channel and transmitters (probably co-located with the other channels of an improved, coordinated county system) to provide improved communications. The routine requirements for Weed, Sanitation, and perhaps other county departments should be incorporated into such an improved system.

Technology Issues

In recent years, as the county has struggled to overcome the situation previously described, the pace of technological change has accelerated. New state and federally initiated communication programs have been imposed. The result has been to cause the county communications system to fall further behind contemporary standards despite efforts to preclude that eventuality. Notable among these pressures have been a Federal Communications Commission (FCC) decision to halve the bandwidth of licensed frequencies by 2013, with acknowledged plans to do so again soon thereafter; the phased adoption of APCO 25 standards on an industry wide basis; worldwide emphasis on digital data and voice transmission; requirements for E911 capabilities in Dispatch; and the post 9/11 and Katrina emphasis nationwide on communications interoperability.

Narrow banding is an FCC mandate that requires all communications be carried out on frequencies whose band-width is 12.5 KHz (as contrasted to the current 25 KHz) not later than 2013. Complicating this requirement is the fact that different state, federal and neighboring agencies are migrating to meet this requirement on different schedules, many well in advance of the 2013 deadline. This carries the potential to jeopardize our continued need to operate with these entities

in situations of mutual aid and the like. While some of the county repeaters, subscriber units and other equipment are currently capable of accommodating that change, not all radios in the current inventory of county users are. Those not adaptable must be replaced with narrow-band capable units (at an estimated total cost of $750,000) and all new equipment purchased throughout the entire time-line of this plan must be so useable. Maintenance of backward compatibility until such time as the local availability of LMRs makes it feasible for a coordinated changeover to be accomplished by the infrastructure itself is of paramount importance. In the process of implementing this changeover, it will be necessary to closely monitor FCC plans for APCO 25. Phase II, as bandwidths of 6.25 KHz are envisioned as being mandated at some point in the future that has yet to be determined.

Much of the interconnectivity issues related to this and other technological advancements have been embodied in the state's Interoperable Montana (IM) program developed under federal impetus and aimed at building a statewide trunked, microwave linked public safety communications system. Such a network would provide a vastly increased capability for the exchange of data (of which voice transmission can be a part) and a quantum leap in communications interoperability. But this has proven to be a very expensive process. To date IM has concentrated almost entirely on building the infrastructure necessary for such a system (with attendant demands for commitment of local resources to facilitate this effort) with little or no attention to the resource requirements it imposes on local jurisdictions in order to be able to use the system when it becomes operational. Because Madison County is some distance from any interstate highway and has no urban center, providing for connectivity within and to the county has been challenging. Site acquisition, installation and local linkage matters, together with obtaining the resources necessary to allow use of the system will require intensive efforts by the county if it is to be able to take advantage of this interconnectivity technology As mentioned in the previous paragraph, microwave technology represents a tremendous opportunity to improve command and control communications capability while greatly expanding the ability to exchange data, both locally and with other agencies with whom we work. At some point, incorporation of microwave capability into the overall Madison County communications system in one way or another is likely to become both desirable and feasible. Preparations for and facilitation of this possibility, while being done at a very basic level currently, will need to be totally integrated into local communications management and planning.

Due to the relatively low density of population and radio users, it is unlikely that trunking will be particularly desirable or feasible within Madison County during the next ten years. It is possible, however, that developments within and around Big Sky may be an exception to that situation and developments related thereto will need to be monitored closely. In any case, certain vehicles or individuals, particularly senior law enforcement, will need to be able to make use of trunking technology in the performance of their duties as trunking plays a bigger and bigger role in public safety matters near the interstates and more urban centers of the state. There is no such capability at the present time.

Big Sky

Although much of Big Sky is in Madison County, very little of the public services provided to this area directly utilize Madison County operational assets. One of the principle barriers to more direct participation, particularly in the field of public safety, is lack of a permanent, reliable communications link between Dispatch in Virginia City, and Big Sky. Recently an interim VHF repeater has been installed on Saddleback Ridge. As mentioned elsewhere in this assessment, this has been provided as an interim measure and will require establishment of a more permanent site, with adequate housing, grounding, back-up power, etc. Despite limitations imposed at present by marginal capability for Dispatch to support its use, first indications are that such a repeater will offer a quantum improvement in the county's capability to reconsider and/or expand

its direct participation in public services in Big Sky. Even if there is not daily use of the radio link in the near term, it would be essential for emergency situations, whatever decisions are made regarding county involvement in Big Sky. Plans by Interoperable Montana to place a micro-wave site in Big Sky offer the opportunity for the county to collocate its VHF repeater at that site. This would do much to improve the quality and lessen the cost of the eventual permanent VHF repeater emplacement.

At the present time Yellowstone Club, which is in Madison County, does not have any level of 911 services. Such calls from Yellowstone Club telephone numbers are received in Gallatin County PSAP and require as many as two or three sequential land-line calls to provide response. One option that would seem to offer a number of potential benefits to both Yellowstone Club and the County would be to make the Madison County PSAP the recipient of such calls and/or set up a secondary PSAP in that area. These options are currently being aggressively explored.

E 9-1-1

9-1-1 is a nationwide telephone number allowing emergency information exchange between the public and an emergency answering center. Its primary objective is the preservation of life and property. During the 1990s, access to basic 9-1-1 service became universal in Montana. Enhanced 9-1-1 (E911) improves call routing to the appropriate PSAP and at the same time allows Automatic Number Identification (ANI) and dispatching of emergency help even if the caller is unable to provide his or her location through Automatic Location Identification (ALI). Expanding these capabilities to include cell phones (usually referred to as Wireless E911) is being accomplished in three successively more capable phases, coordinated through the Montana Public Safety Services Bureau (PSSB). Madison County has been progressing with the state coordinated E911 program, but such progress has been slowed by a less than optimal amount of centralized control and planning.

Paging and Alerting

With the exception of law enforcement, virtually all of the public safety responders in the county are volunteers who must be contacted in time of need while they are engaged in their “civilian” or private life, sometimes far removed from their response center. Indeed, the law enforcement system itself places heavy reliance on being able to request timely augmentation and support from off-duty personnel. The paging system has been plagued by an ongoing series of difficulties and is need of comprehensive (and coordinated) upgrade, both in terms of the countywide infrastructure and in terms of user units. Additional capacity and increased reliability are urgently needed. While this can be accomplished as part of other Dispatch upgrades addressed elsewhere, it is important enough in its own right to require comment.

There is at present no adequate, formalized system for alerting citizens and for the provision of emergency information in time of disaster.

Dispatch

Assessment of Dispatch and what its strengths and shortfalls might be is hampered by conflicting possibilities as to where it is likely to be physically located and when any changes in that location might occur. Certain opportunities and potential for improvement relate to its relocation to the proposed new law and justice center, whereas considerable spatial and infrastructure restrictions are inherent in its current location in the county courthouse. Similarly evolving plans and policies relating to what role Madison County will take in fulfilling its public safety and other responsibilities in Big Sky impact assessment and planning for Dispatch and the rest of the communications infrastructure. The Big Sky Public Safety Planning Study (BSPSPS) completed in December 2006 listed institution of a PSAP in Yellowstone Club as a possibly prudent move for a number of listed reasons. Madison County officials are engaged in laying the groundwork and needs to take a

major role in exploring this option, as it could play a significant role in determining what improvements should be made in the Virginia City PSAP, including timing and funding. These and other Big Sky developments will need to be carefully and continually monitored to insure that requirements on the communications system are considered and accommodated as they evolve.

In any case, there is little doubt that the dispatch consoles currently in use must be replaced at the first available opportunity. The Motorola Centra-Com II currently in place is no longer logistically supported and its capabilities place severe limitations on other attempts to upgrade the county communications infrastructure. The probability that traffic load will increase in the next few years is extremely high, leaving little doubt that the system will need to increase its number of channels and Dispatch will, in all likelihood require more operators on duty and/or available for augmentation at any given time. Such growth needs to be done in an integrated fashion with full consideration of ergonomic and other technological factors. The radios & other equipment in Dispatch and its uplink to Virginia City Hill will also need to comply with T1A P25 standards and narrow banding; ensure an ongoing integration of the entire Dispatch Center/PSAP with E911 advancements; address data flow (including telecommunications) limitations and a number of other issues.

Presently the telecommunications capability to support Dispatch and related MCSO operations is increasingly becoming a limiting factor. Regardless of where Dispatch is to be located, consideration of the landline feed to its wireless operations must be addressed as other improvements are integrated into the communications system.

Although Dispatch is currently with the security area of the Madison County Sheriff's Office, internal security for the Dispatch area itself is marginal at best. Ergonomic factors also inhibit optimum performance by the Dispatch operators.

Mobile Data

Availability of mobile data terminal technology would be extremely useful to county public safety services personnel. Currently high costs and technological difficulties represent major hurdles to be overcome before it becomes generally available, particularly in the more rural counties. As interconnectivity becomes a useable reality under the state's Interoperable Montana (IM) program and other initiatives, however, access to the statewide mobile data system will become increasingly available and even necessary, to local law enforcement. At such time as additional applications are made available that would meet the needs of other public safety users, the system will become increasingly desirable, and its implementation will need to be expanded to include them. At the time of this writing, the statewide MDT program appears to be "dead in the water", at least in part due to lack of operations and capital funding. In the interim, fire departments, ambulances, Search and Rescue and the like may find it desirable to obtain laptop computers with software capable of displaying maps using data from the County GIS/IT Department.

Encryption

Plain language VHF communications offers little, if any, legal expectation of privacy. Traffic is routinely monitored by a wide spectrum of private and semi-private scanners and users. At the same time an increasing amount of private, legally restricted information has the potential to be passed over wireless circuits, particularly in the case of emergency medical services as the two way flow of information between field operatives and medical control expands the capability to provide effective response. Similarly, law enforcement is becoming increasingly complex and potentially hazardous as growth and urbanization impacts that segment of public safety services. As immigration to digital capable radios reaches operational reality, selective traffic encryption will become an increasingly desirable and viable option. Statewide encryption protocols are currently under development by the Montana Highway Patrol (MHP) in coordination with Interoperable Montana (IM).

Telecommunications
Due to coverage and security implications outlined elsewhere in this assessment, telecommunications currently does and will for some time play a big part in county communications. When traffic overloads the single channel VHF system, coverage limitations are encountered or there is a need for increased privacy, responders frequently turn to cell phones or land-lines to talk with Dispatch or other responders. While much of that privacy is perceived rather than actual, this usage is a very real part of service provision. As other improvements are made the reliance on telecommunications as a substitute for wireless communications should decrease. As outlined previously, however, the telephonic support provided to Dispatch and MCSO operations is extremely important and must be considered as part of all changes and enhancements to the system.

Goals and Objectives

General
Any major transition or implementation plan, such as is contained herein, is only feasible when performed in an orderly, phased approach and within a logical, well-understood framework. The Madison County Wireless Communications Plan seeks to establish such an approach and such a guiding framework. Due to the complexities of the environment under consideration, however, and the potential for impact by external forces beyond the direct control of county officials, the plan must be routinely reassessed and adjusted as a matter of continuing concern.

The goals and objectives for implementation are defined within three loosely constructed and somewhat arbitrary phases: Near Term, Mid Term and Long term. Together they cover approximately the next ten years. Specific time frames indicated are only approximations for reasons as outlined in the proceeding paragraph and in portions of the current assessment. There is no question that the county's indigenous resources are very limited and will probably not be able to fund the entire scope of implementation. The availability of grant funding and other alternative sources of assistance in carrying out the plan will have a significant impact. Everyone involved in county communications matters will need to remain constantly aware of the limitations and opportunities that this implies.

Mid term and long term activities will generally require extensive planning and coordinating on a regional basis, consistent with technological developments in this fast moving field and with programs undertaken by our neighbors, state and federal entities.

Due to the complexities of their inter-relationships and the plethora of outside forces that impact them yet are not locally controllable (and sometimes only foreseeable dimly or with difficulty); no priority is to be inferred by the order in which goals and objectives are listed herein. It should also be noted that some of the stated goals and/or objectives may be seen to overlap. No inference is intended as to priorities or relative importance as a result of such overlap, particularly as regards allocation of resources.

Near Term Goals (1-2 Years) A major focus in the near term is to establish the framework within which an orderly system-wide improvement program can be accomplished. At the same time it begins to address reliability improvements, expansion of coverage and accelerating the upgrade of Dispatch in order to facilitate other planned and unplanned system improvements.

Administration Goal: Provide for centralized overall management, coordination and administration of county wireless communications operations, maintenance and improvement.

- **Objective 1:** Establish a Madison County Department of Communications, answerable to the Board of County Commissioners and headed by a person tasked with normal departmental management duties such as planning, personnel administration, financial management, and providing for operations and maintenance of the county wireless communications system. Inherent in the Department Head's duties will be orderly planning and proactive development of alternative sources for obtaining financial and other resources necessary for accelerated enhancement of the communications system. Implement separate budgetary identification for all communications operations, maintenance, capital and all other expenditures.
- **Objective 2:** Formally confirm that the Madison County Sheriff is responsible for the day to day operation of the Dispatch Center using Department of Communications resources.
- **Objective 3:** Approve, maintain and implement an ongoing communications plan and necessary supporting plans for operations, maintenance and enhancement of the Madison County radio communications system consistent with available resources. Utilize that plan as the guiding framework for all such activity, including grant applications and other financial matters.
- **Objective 4:** Establish an active Communications Guidance Committee to advise and assist the department head established by Objective 1 in the performance of his or her duties and to facilitate the interface between communications management and communications system users.
- **Objective 5:** Foster development of cooperative relationships with our neighbors and other partners, including the private sector, aimed at coordinating and improving wireless communications.

Protocols & Procedures Goal: Establish and promote standardized communications operating procedures throughout the county.

- **Objective 1:** Draft, disseminate and maintain standardized operating procedures for guidance of county wireless communications users that support national and international protocols and improve operations.
- **Objective 2:** Through an aggressive program of training and exercise, promote usage of Madison County standardized operating procedures developed under Objective 1.
- **Objective 3:** Ensure that developing NIMS, ICS and other federal and state guidance is incorporated into county operating protocols and procedures.

VHF Coverage Goal: Aggressively seek to improve two-way coverage of the Madison County wireless communications system, including both public safety and public service users with the intent of providing 90% coverage or better.

- **Objective 1:** In coordination with the infrastructure planning outlined elsewhere herein, develop a plan designed to optimize wireless communications coverage for all users of the Madison County communications system.
- **Objective 2:** Actively promote implementation of the plan developed under Objective 1 in an orderly, effective manner, ensuring adherence to the appropriate industry standards and regulations. Obtain and maintain necessary licenses and permits to support the plan and ensure its compliance with laws, regulations and established industry standards.
- **Objective 3:** Ensure that appropriate contractual site agreements and site access agreements are in place for all county communications sites.
- **Objective 4:** Seek alternative sources of funding to facilitated implementation carried out under Objective 2.

E9-1-1 Program Goal: Centralize and facilitate management of the county's 9-1-1/E9-1-1 implementation program.

- **Objective 1:** Explore and develop alternatives for the provision of 9-1-1 services to telephone exchanges physically located within the county but not currently routed through the Virginia City PSAP.
- **Objective 2:** Re-establish an active 9-1-1 Guidance and Planning Committee
- **Objective 3:** Centralize management (including financial) and administration of the Madison County 9-1-1/E9-1-1 implementation. Ensure that it is coordinated with other aspects of the communications system enhancement, operations and maintenance and visa-versa.

Infrastructure (Including Dispatch) Goal: Establish and implement coordinated planning for a robust, flexible communications infrastructure to take advantage of burgeoning technology; comply with applicable mandates and regulations; and improve system capability to meet foreseeable increases in operational demand. Incorporate compliance with NFPA 1221 and/or other similar standards.

- **Objective 1:** Develop and implement a cohesive and detailed plan or plans for operations, maintenance and enhancement of Madison County's communications infrastructure. Ensure consideration of opportunities to increasing its reliability and survivability.
- **Objective 2:** Explore and develop partnerships with private and public agencies in the interests of furthering implementation of improvements and easing the county burden for operations and maintenance.
- **Objective 3:** Establish a county-wide policy and procedure for false alarms, aimed at reducing the growth in such alarms, particularly those initiated by automatic alarm systems.
- **Objective 4:** Consistent with available resources, begin preparations for implementation of Phase I narrow banding on a county-wide basis.
- Explore alternative and develop plans aimed at increasing system reliability and robustness, including desirability of establishing alternate PSAP(s), providing for mutual back-up capabilities with neighboring PSAPs, etc.

Subscriber Equipment Goal: Replace all outdated and non-compliant two way radio and paging equipment currently in use with P25 compliant equipment capable of narrow band and wide band communications, as well as analog and digital operation in order to allow continued communications with federal, state and local entities.

- **Objective 1:** Develop and implement a detailed plan to guide procurement (including scheduled replacement) of subscriber equipment for all users of the county wireless communications system.
- **Objective 2:** Replace all non-compliant public safety radios in accordance with the three-tiered LMR enhancement plan shown in Appendix A
- **Objective 3:** Replace all non-compliant Road, Weed, Sanitation and other county radios in accordance with the three-tiered LMR enhancement plan shown in Appendix A

Paging & Alerting Goal: Continue tone and voice paging on the existing channel while improving spot coverage and subscriber equipment. Improved alerting….?

- **Objective 1:** Design an optimal Dispatch/PSAP, flexible enough to meet anticipated future needs while correcting existing technologic and ergonomic shortfalls. Prepare a detailed plan for achieving that design while advising and participating in the process of determining its ultimate location. Initiate improvements as soon as practicable.
- **Objective 2:** Explore and develop means of alerting the general public do imminent danger or emergency.
- **Objective 3:** Seek to obtain a NOAA weather repeater at some location that will allow early warning of imminent dangers or adverse weather to schools and other county residents. Install appropriate receivers in the schools to make use of this capability.

Big Sky Goal: Proactively explore and develop alternatives for the improvement of county wireless communications to Big Sky with a view to providing the optimum and most flexible support to the county's provision of safety and other services thereto.

- **Objective 1:** Develop and implement a plan for the appropriate provision of 9-1-1 services to the Yellowstone Club.
- **Objective 2:** **I**ncorporate Big Sky into communications planning, enhancements, operations and maintenance as an integral part of the Madison County wireless communications system. In the process, ensure that maximum flexibility is maintained for impending decisions relating to the provision of public services to this area.
- **Objective 3:** Explore desirability and feasibility of establishing an alternate PSAP in Big Sky.

Telecommunications Goal: Facilitate and coordinate improvements to the telecommunications system that supports and provides input to operations of the county wireless communications system.

- **Objective 1:** Encourage expansion of cell phone coverage in the county as a back-up communications medium for the installed VHF system.
- **Objective 2:** Develop means by which satellite phones and/or other emerging technology might enhance and support or enhance any aspect of the county wireless communications system.
- **Objective 3:** Coordinate and promote maintenance and improvement of telephone systems that support the wireless communications system.

Interoperable Montana Goal: Participate in the Interoperable Montana (IM) initiative. Actively seek to promote inclusion of Madison County's interests in its planning and implementation.

- **Objective 1:** Actively participate in SCMIC in furtherance of county interests and goals and to promote interoperable communications.
- **Objective 2:** Proactively seek to promote and implement the proposed SE Montana microwave loop within the county and, by inference, within the necessary neighboring jurisdictions. Provide other support to IM as appropriate to enhance interoperable communications.

Maintenance and Support Goal: Integrate planned preventive maintenance and situational repair into the overall planning, management, and operation of the county communications system.

- **Objective 1:** Develop a planned maintenance and replacement program, to include a program of preventive maintenance. Incorporate this plan or plans as a routine consideration in the budgetary processes and operation of the system. Implement the maintenance plan.
- **Objective 2:** Explore options and determine the feasibility of entering into a contractual or other relationship for the routine performance of necessary maintenance.

Mid Term Goals (3-7 Years) An orderly transfer to system wide narrow banding will be required during this period. As the immediate needs of the wireless communications system are met during the near term, the county will become positioned to take advantage of interconnectivity improvements, technological advances and other developing processes to continue to move ahead in providing communications support as the county grows and adapts. Reliance upon volunteer and auxiliary personnel to staff or augment the response cadre will continue to place a premium on attaining an efficient, reliable paging capability. As the population, both resident and transient, continues to grow, public alerting and the associated provision of emergency related information

will become of increasing importance. Toward the end of the period, it may be desirable to replace analog with digital communications in order to take advantage of its unique capabilities.

Big Sky Goal: Complete the integration of Big Sky into the county communications system as a regular component thereof. Respond to developing policy and political considerations as they develop.

- **Objective 1:** Ensure that Big Sky and its adjacent areas is actively considered and included as a functional part of all county communications matters.

Narrow banding Goal: Comply w/ FCC mandate for 12.5 KHz narrow banding prior 2013 while remaining aware of developments relating to Phase II narrow banding (6.25 KHz).

- **Objective 1:** Plan and implement a coordinated shift of the county communications to Phase I narrow banding. Develop resources to enable a timely, orderly and universal participation in the change.
- **Objective 2:** Monitor developments in federal planning for APCO Phase II.

Coverage Goal: Complete implementation of the coverage plan developed in the near term.

- **Objective 1:** Proactively seek to develop and implement improvements in coverage aimed at achieving reliable 100% coverage for public safety and at least 90% coverage for the remainder of county services (with attendant capability for integration into overall public safety communications during times of disaster or large scale emergency.

Infrastructure Goal: Improve reliability, capability and survivability of county wireless communications system across the board. Ensure total integration of E9-1-1 program enhancements into day to day PSAP operations. Comply with federal and state mandates.

- **Objective 1:** Incorporate the E911 capabilities into Dispatch operations and planning as an integral part of the PSAP. Continue to implement the E911 enhancement program in coordination with state and federal planning.
- **Objective 2:** Complete Dispatch relocation as required along with integrated upgrading of the consoles, radios, and other integral dispatch equipment, consistent with available resources.
- **Objective 3:** Investigate, plan and incorporate measures designed to improve reliability and survivability of the county wireless communications system, including the capability for alternative PSAP/dispatch operation in case of damage to the primary center.
- **Objective 4:** Complete compliance with TIA P25 standards throughout the system.
- **Objective 5:** Closely integrate communications requirements into the development of an enhanced county emergency operations center.
- **Objective 6:** Implement plans for a secondary PSAP as determined appropriate during considerations undertaken in the near term.
- **Objective 7:** Implement plans for PSAP linkage with neighboring jurisdictions as feasible and determined desirable during the near term.
- **Objective 8:** Monitor VoIP and other developing technologies to insure their incorporation into plans and improvements to the county wireless communications system.

Interconnectivity Goal: Improve interconnectivity through integration of the Madison County wireless communications system with the Interoperable Montana microwave system in a manner that will enhance its operation within the county.

- **Objective 1:** Link the Madison County EOC/Dispatch with the statewide Interoperable Montana microwave system, including linkage to the Big Sky area.
- **Objective 2:** Incorporate increased data transmission capability inherent in Objective 1 into planning, enhancement and operation of the county communications system.

Digital Communications Goal: Consider the costs and benefits of transitioning the county wireless communications system to a fully digital system and begin appropriate preparations therefore.

- **Objective 1:** Explore the desirability and feasibility of replacing all or a portion of county analog voice communications with digital voice communications.
- **Objective 2:** Initiate actions to appropriately implement the decisions made pursuant to Objective 1.
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Paging & Alerting Goal: Explore and develop alternatives to improve paging coverage and reliability (including digital paging). Improve county capabilities for alerting the public in case of need and for the provision of amplifying information at such times. Facilitate & info flow during emergencies? Digital paging on a separate channel?

- **Objective 1:** Research alternatives, plan and implement paging improvements as a matter of priority.
- **Objective 2:** Develop and analyze alternatives possibilities for improvement of general alerting capabilities, including Reverse 911. Begin implementation of the most feasible alternative(s).
- **Objective 3**: In concert with the county public information officer, seek to develop and expand the capability to provide information to the populous in times of disaster or emergency.

Long Term Goals (8-10 Years) Continued rapid expansion of technology can be expected that will require constant monitoring and active research in order to allow Madison County to appropriately benefit from such developments during a period of mushrooming growth and change within the county and neighboring areas. Mobile data transmission capability and encryption can be expected to become increasingly desirable, available and affordable.

Infrastructure Goal: Successful achievement of near term and mid term goals previously outlined will have allowed the county to attain parity with wireless communications norms found in similar jurisdictions across the country. No longer relegated to "playing catch up", the county will need to maintain this position of parity while responding to what may be expected to be very significant technological advancements.

- **Objective 1:** Support continued improvements in reliability, survivability and capability of the county wireless communications system.
- **Objective 2:** Actively promote and support communications interoperability and interconnectivity with federal, state and local partners and neighbors in the public and private sector.

Paging and Alerting Goal: Reevaluate paging requirements with a view to ensuring effective and reliable, paging. As growth continues to impact the county, improve capability for alerting residents and non-residents to disaster or emergency situations.

- **Objective 1:** Complete incorporation of digital paging.
- **Objective 2:** Continue improvements to county emergency alerting capability and emergency information dissemination capability.

Encryption Goal: Once the migration to digital capable radios is complete, encryption can be implemented on a selectable basis for those channels and situations that will benefit sufficiently to justify its resource demands.

- **Objective 1:** Analyze, plan and implement encryption as appropriate.

Mobile Data Goal: Consistent with progress made with the statewide Mobile Data Terminal program and related connectivity matters, ensure that Madison County is positioned to take advantage of this capability when it becomes feasible. Concurrently ensure that adequate consideration is given to the potential for developing a system independent of the statewide system.

- **Objective 1:** Monitor statewide and other developments in Mobil Data Terminal implementation and seek to position the county to elect to participate or develop and independent system at the earliest possible time consistent with available resources and technological developments.

Appendix A

Land Mobile Radio Capabilities

Intent: The purpose and intent is to provide guidelines for establishment of a three-tiered level of capability for all public land mobile radios (LMR) within Madison County and encourage implementation of these guidelines into procurement, operation and maintenance of such radios wherever possible throughout all portions of the local wireless communications community.

Tier 1: Selected radios, primarily those most likely to be used by public safety responders outside the county and/or by responders in a supervisory capacity, will be capable of upgrade to trunking at such time as the state infrastructure develops in accordance with current statewide Interoperability Montana planning. These radios will have greater channel capacity than the rest of the units procured in order to facilitate mutual aid and other aspects of interoperability. They will also be upgradeable to encryption when that capability is supported locally and on a statewide basis.

Tier 2: Station radios and the portable and mobile equipment to be used by the majority of public safety responders will have a lesser channel capacity but will be narrowband and digital capable (and backward compatible) and will be upgradeable to encryption when appropriate. While P25 compliant, these units are not intended for eventual upgrade to trunking.

Tier 3: The third tier of capability is primarily intended for the public service sector (as contrasted to public safety). It would have a lesser number of channels per unit, but would otherwise be P25 compliant, capable of narrow banding, etc.